Space Weather Forecast

Issued on Thursday, 15 August 2024 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Moderate class flares expected, a chance of Strong class flares. A chance of Minor Solar Radiation storming.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High with four Moderate class flares and a single Strong class flare observed in the past 24 hours, the latter of which peaked at 14/0641 UTC originating from the large spot in north-centre disk. This spot is now the largest and most active region and has significant magnetic complexity, with the trailing portions loosely connected to a large delta central spot with a somewhat unusual configuration. The only other spot of note is a large spot in the southwest, it retains a complex magnetic structure with at least one delta spot around the large and compact central spot, although is becoming harder to analyse as it approaches the western limb. All other spots are currently small and simple.

A faint, partial halo CME (coronal mass ejection) associated with the strong flare at 14/0640UTC is likely to have an Earth-directed component. ENLIL analysis predicts that this CME will arrive at Earth early on Day 3 (17 Aug); however, confidence is low.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of waning coronal mass ejection magnetic cloud conditions, with perhaps an embedded weak transient during the early hours of the 14th Aug. Solar wind speeds were initially slightly elevated and barring some slight variation initially have been on a slow declining trend to current background levels. The Interplanetary Magnetic Field was largely weak, below 8nT, but touched into moderate 8-9nT towards the end of the period. The north-south component, Bz, varied weakly. Geomagnetic activity ranged between Quiet to Active levels (Kp 1-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High solar activity is forecast, with Moderate-class flares expected and a chance of an isolated Strong-class flare.

Solar Wind /Geomagnetic Activity: A faint, CME (coronal mass ejection) associated with the strong flare at 14/0640UTC is predicted to arrive at Earth early on Day 3 (17 Aug); however, confidence is low due to the faintness of the CME. The fast wind from a coronal hole to the north of the disc is expected to mostly pass north of the Earth-Sun line, with no major enhancement expected.

Geomagnetic activity is expected to remain Quiet to Unsettled (Kp 0-3) at first with a chance of Active (Kp 4) intervals. Following the arrival of the CME on Day 3 (17 Aug), G1-G2/Minor-Moderate storms are likely, with only a slight chance of G3/Strong storm intervals, although this has low confidence.

Energetic Particles / Solar Radiation: A heightened risk of flare activity brings a chance of reaching or exceeding Minor Radiation Storm levels should any significant flares occur, although this risk reducing slightly through the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	70	30
Strong	G3	No	1	1	15	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	Yes	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	25	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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